Health supplement Spirulina induces inflammatory cytokine production via monocyte derived dendritic cells and classic monocyte activation in Dermatomyositis

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The popular herbal supplement Spirulina has previously been shown to stimulate inflammatory cytokine production in Dermatomyositis (DM) patients in vitro. We sought to evaluate whether Spirulina’s immunostimulatory effects differ in healthy controls (HCs) compared to DM. We performed ELISA on Spirulina stimulated HC and DM PBMC supernatants, demonstrating similar effects in both HCs and DM with Spirulina significantly increasing TNFα and IFNγ levels. Inhibition of TNFα or IFNγ secretion in DM patients. With stimulation of both MoDC and CM, IFNγ secretion was increased similarly. (n = 3, p < 0.001). The mean percent of CMs secreting IFNγ also increased (p < 0.0001), and pre-treatment with TLR4 inhibitor suppressed CM activation (p < 0.05). Moreover, the MFI of CMs secreting IFNγ increased significantly (p < 0.005). TNFα or IFNγ inhibition decreased MFI for both MoDC and CMs (p < 0.05 and p < 0.001, respectively). TNFα secretion was increased by 1.14% of total MoDCs with no stimulation to 49.10% (12.4) at 0.3 mg/mL Spirulina (p < 0.05). TNFα and IFNγ inhibition suppressed the percentage of Spirulina-induced MoDCs secreting TNFα (p < 0.05). TNFα inhibition trended towards significance in CMs (p = 0.033). These data demonstrate that Spirulina induces CM and MoDC activation in DM, likely via TLR4 or TBK1 activation.

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ABSTRACTS | Adaptive and Auto-Immunity

Multiplexed skin immunophenotyping of new-onset dermatomyositis lesions following first time use of Spirulina

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Dermatomyositis

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Systemic hyperinflammation as a driver of maculopapular drug exanthema in severely ill COVID-19 patients

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Coronavirus disease 2019 (COVID-19) has been associated with cutaneous findings, some being the result of drug hypersensitivity reactions. Here, we utilize imaging mass cytometry (IMC) to characterize the cutaneous immune response in maculopapular drug rashes (MDR), including those associated with COVID-19 infection (COVID MDR). For comparison, skin from healthy volunteers and patients with drug rash with eosinophilia and systemic symptoms (DRESS) was analyzed. Results demonstrated that COVID MDR are characterized by a more prominent infiltration of cytotoxic CD8+ T cells and highly activated, phenotypically shifted monocytes/macrophages (Mo/Mac) clusters in comparison to MDR and DRESS. RNA sequencing transcription of the affected skin also demonstrated a more robust cytotoxic response in lesional COVID MDR skin. Serum proteomic profiling of COVID MDR patients revealed up-regulation of various inflammatory mediators (IL-1β, IL-6, IL-8, IL-18, IL-6, TNF-α, and IFNγ), eosinophils and Mo/Mac -attracting chemokines MCP-2, MCP-3, MCP-4 and CCL11. Analyses of cytokine networks demonstrated a relatively milder cytokine storm in DRESS compared to COVID MDR, while MDR did not exhibit such features. These results suggest cutaneous involvement in COVID MDR and imply a role for DRESS in COVID-19 pathobiology.

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